O Level Pure Physics MCQs

Energy, Work and Power Test 3.0

Q1

Which of the following is the rate of the product of the force and the distance which is measured in the direction of the force?

A power   **B** moment   **C** work done   **D** acceleration

Q2

A student is carrying a Science book while walking a distance of 8.0 m along a corridor. The weights of the student and the book are 500 N and 20 N respectively.

What is the work done by the student in carrying the book against gravity?

A 0 J   **B** 160 J   **C** 4160 J   **D** 5200 J
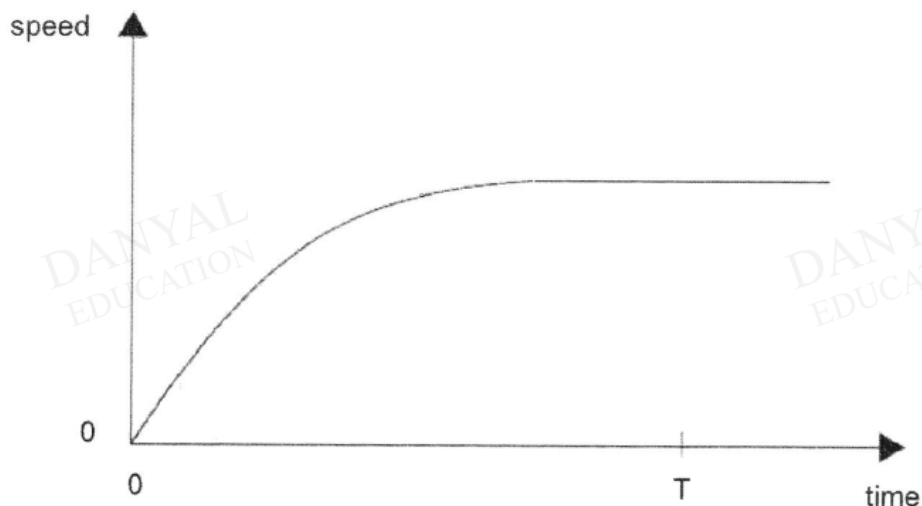
Q3

When a force of 5.0 N is exerted on an object, the object moves at a constant speed of 0.20 m/s. What is the power exerted on the object if the object travels a distance of 50 m?

A 1.0 W   **B** 25 W   **C** 250 W   **D** 500 W

Q4

The variation with time of the vertical speed of a ball falling in air is shown below.

During the time from 0 to T, the ball gains kinetic energy and loses gravitational potential energy ΔE_p. Which of the following statements is true?

A ΔE_p is equal to the gain in kinetic energy.
B ΔE_p is greater than the gain in kinetic energy.
C ΔE_p is equal to the work done against air resistance.
D ΔE_p is less than the work done against air resistance.

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Q5

The diagram below represents energy transfers in an engine.
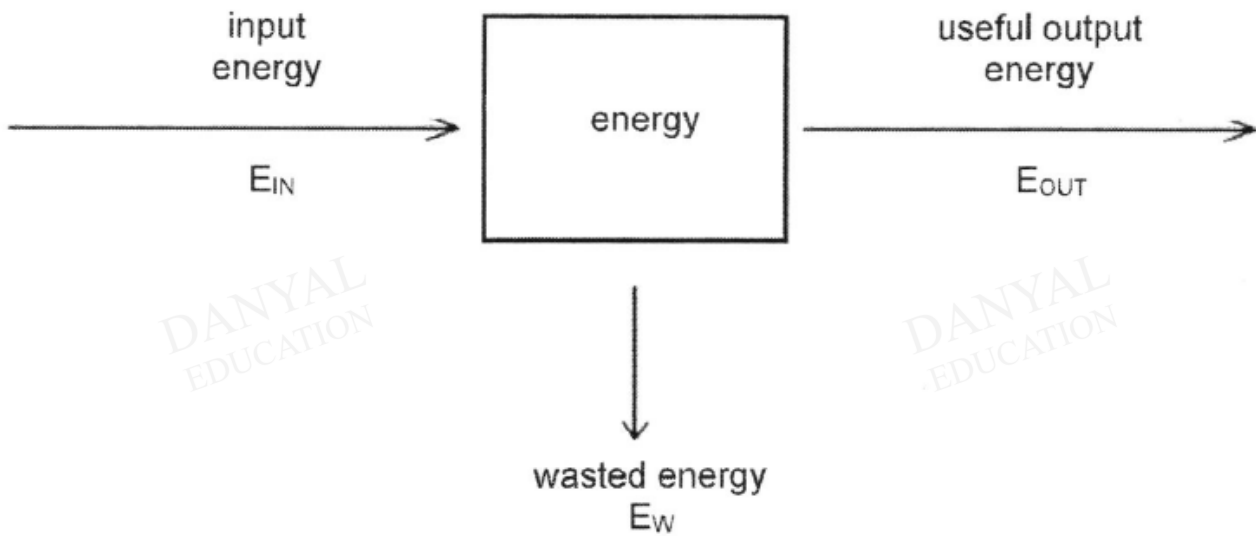
Which expression gives the efficiency of the engine?

A $E_W \div E_{IN}$
B $E_W \div E_{OUT}$
C $E_{OUT} \div E_{IN}$
D $E_{OUT} \div E_W$

Q6

A rocket of total mass M is travelling at a speed v. The engine of the rocket is fired and fuel is used up. The mass of the rocket decreases to $M/2$ and its speed increases to $2v$.

What happens to the kinetic energy of the rocket?

A   The kinetic energy doubles.

B   The kinetic energy halves.

C   The kinetic energy increases by a factor of four.

D   The kinetic energy remains the same.

Q7

A toy boat was propelled steadily from rest to reach a speed of 2.0 m/s in 10 seconds. During this time, there is an average water resistance of 3.0 N acting between the base of the boat and the water.

What is the rate of work done against water resistance?

A 3.0 W   **B** 6.0 W   **C** 30 W   **D** 60 W

Q8

A car is driven along a level road. The total energy input from the petrol is 100 kJ and the car wastes 40 kJ of energy.
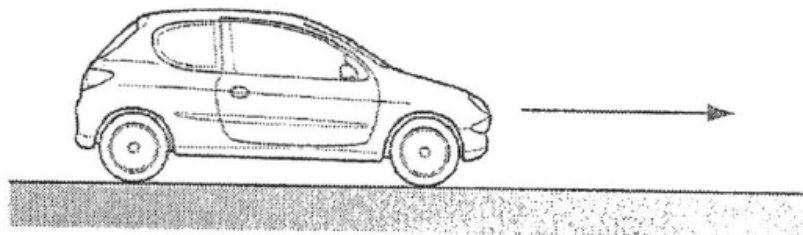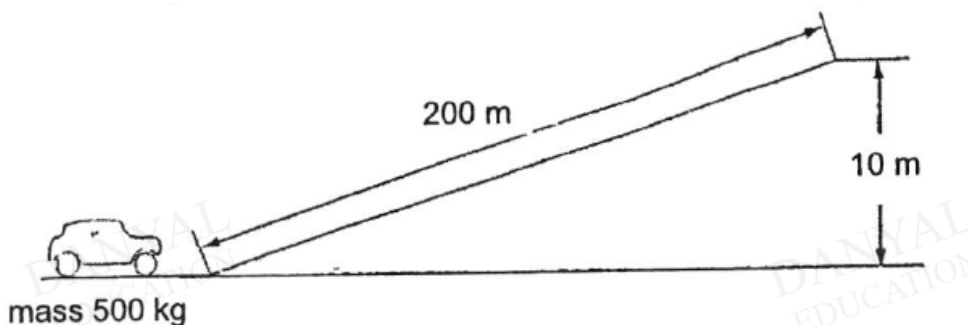

What is the efficiency of the car?

A 20%   **B** 40%   **C** 60%   **D** 80%

Q9

The diagram shows a small car of mass 500 kg approaching a hill. It moves up the hill with uniform speed.

How much work is done in moving the car up the hill? You may ignore frictional forces.

A 5×10^3 J   **B** 5×10^4 J   **C** 1×10^5 J   **D** 1×10^6 J

3

Q10

The motor in the diagram has a power input of 500 W. It is used to lift a load weighing 600 N through a vertical height of 10 m in 20 s.

rope length
3 m

weight
600 N

power input
500 W

time taken
20 s

10 m
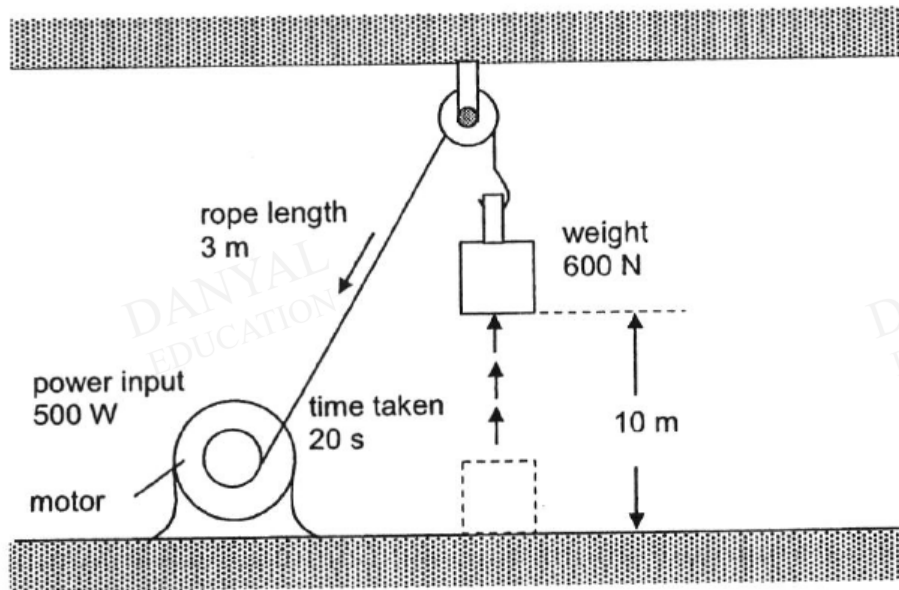
motor

What is the useful power output of the motor?

A 300 W   **B** 390 W   **C** 500 W   **D** 800 W

Answers

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Q1 A

Q2 A

Q3 A

Q4 B

Q5 C

Q6 A

Q7 A

Q8 C

Q9 B

Q10 A